FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	M09434A Sm Tank	Client:	Alaskan Copper Works
Date Received:	08/30/12	Project:	% of Acid M09434, F&BI 208448
Date Extracted:	08/31/12	Lab ID:	208448-01 x1000
Date Analyzed:	08/31/12	Data File:	208448-01 x1000.062
Matrix:	Aqueous	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	92	60	125
Indium	85	60	125
Holmium	91	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	1,460,000
Nickel	1,520,000
Copper	242,000
Zinc	<1,000
Arsenic	1,190
Silver	<1,000
Lead	1,770
Iron Screen	7,190,000

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	M09434B Lg tank	Client:	Alaskan Copper Works
Date Received:	08/30/12	Project:	% of Acid M09434, F&BI 208448
Date Extracted:	08/31/12	Lab ID:	208448-02 x1000
Date Analyzed:	08/31/12	Data File:	208448-02 x1000.063
Matrix:	Aqueous	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	99	60	125
Indium	84	60	125
Holmium	91	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	2,280,000
Nickel	1,960,000
Copper	155,000
Zinc	4,920
Arsenic	1,520
Silver	<1,000
Lead	<1,000
Iron Screen	10,700,000 ve

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	M09434B Lg tank	Client:	Alaskan Copper Works
Date Received:	08/30/12	Project:	% of Acid M09434, F&BI 208448
Date Extracted:	08/31/12	Lab ID:	208448-02 x10,000
Date Analyzed:	08/31/12	Data File:	208448-02 x10,000.072
Matrix:	Aqueous	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	85	60	125
Indium	88	60	125
Holmium	94	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	2,740,000
Nickel	2,380,000
Copper	188,000
Zinc	<10,000
Arsenic	<10,000
Silver	<10,000
Lead	<10,000
Iron Screen	12,500,000

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	Alaskan Copper Works
Date Received:	Not Applicable	Project:	% of Acid M09434, F&BI 208448
Date Extracted:	08/31/12	Lab ID:	I2-565 mb
Date Analyzed:	08/31/12	Data File:	I2-565 mb.030
Matrix:	Aqueous	Instrument:	ICPMS1
Units:	ug/L (ppb)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	107	60	125
Indium	106	60	125
Holmium	108	60	125

Analyte:	Concentration ug/L (ppb)
Chromium	<1
Nickel	<1
Copper	<1
Zinc	<1
Arsenic	<1
Silver	<1
Lead	<1
Iron Screen	<250

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/11/12
Date Received: 08/30/12
Project: % of Acid M09434, F&BI 208448
Date Extracted: 09/04/12
Date Analyzed: 09/04/12

RESULTS FROM THE ANALYSIS OF AQUEOUS SAMPLES FOR SPECIFIC GRAVITY @ 15.56 °C

Sample ID Laboratory ID	Specific Gravity
M09434A Sm Tank 208448-01	1.13
M09434B Lg tank 208448-02	1.16

Note: The third significant digit is an estimate

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/11/12
Date Received: 08/30/12
Project: % of Acid M09434, F&BI 208448
Date Extracted: NA
Date Analyzed: 09/05/12

RESULTS FROM THE ANALYSIS OF AQUEOUS SAMPLES FOR PERCENT ACID BY VOLUME

Sample ID Laboratory ID	Percent Acid
M09434A Sm Tank 208448-01	9.3
M09434B Lg tank 208448-02	10.5

Date of Report: 09/11/12
Date Received: 08/30/12
Project: % of Acid M09434, F&BI 208448

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AQUEOUS SAMPLES FOR TOTAL METALS USING EPA METHOD 200.8

Laboratory Code: 208457-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Chromium	ug/L (ppb)	20	1.14	83	89	71-130	7
Nickel	ug/L (ppb)	20	3.22	82	89	71-120	8
Copper	ug/L (ppb)	20	<1	79	85	52-134	7
Zinc	ug/L (ppb)	50	4.39	83	86	51-142	4
Arsenic	ug/L (ppb)	10	15.9	73 b	103 b	51-167	34 b
Silver	ug/L (ppb)	5	<1	81	90	73-114	11
Lead	ug/L (ppb)	10	<1	86	96	85-115	11

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Chromium	ug/L (ppb)	20	96	80-119
Nickel	ug/L (ppb)	20	101	83-119
Copper	ug/L (ppb)	20	101	81-120
Zinc	ug/L (ppb)	50	100	82-120
Arsenic	ug/L (ppb)	10	96	81-118
Silver	ug/L (ppb)	5	96	85-116
Lead	ug/L (ppb)	10	97	84-120

Date of Report: 09/11/12
Date Received: 08/30/12
Project: % of Acid M09434, F&BI 208448

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF AQUEOUS SAMPLES FOR SPECIFIC GRAVITY @ 15.56 °C

Laboratory Code: 208448-02 (Duplicate)

Analyte	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Specific Gravity	1.16	1.15	1	0-2

Date of Report: 09/11/12
Date Received: 08/30/12
Project: % of Acid M09434, F&BI 208448

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF AQUEOUS SAMPLES FOR PERCENT ACID

Laboratory Code: 208448-01 (Duplicate)

Analyte	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Percent Acid	9.3	9.3	0	0-20

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

208448

SAMPLE CHAIN OF CUSTODY

ME 08-30-12 AT2

Send Report To Gerard Thorpen
Company Alaskan Copper works
Address 6028 S. Hanford ST
City, State, ZIP SEATTLE WA 98134
Phone #(206) 571-6033 Fax #(206) 382-4309

SAMPLERS (signature)

PROJECT NAME/NO.: % of Acid

PO #: M09434

REMARKS

Page: _____ of _____

TURNAROUND TIME
- ☐ Standard (2 Weeks)
- ☒ RUSH 4 Day
- Rush charges authorized by:

SAMPLE DISPOSAL
- ☐ Dispose after 30 days
- ☐ Return samples
- ☐ Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	ANALYSES REQUESTED: TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260	SVOCs by 8270	HFS	Spec Gravity	% of HNO3	CR CU NI Zn	As Ag Fe	Pb Zn	Notes
M09434A	01	8/30/12	11:15	HNO3	1							X	X	X	X	X	
Sn tank																	
M09434B	02	8/30/12	11:15	HNO3	1							X	X	X	X	X	
Cu tank																	

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Gerard Thorpen	ACW	8/30/12	12:22
Received by:	Nhan Phan	FEBI	8/30/12	V
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

FORMS\COC\COC.DOC

Samples received at 23 °C

AKC-00036291

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
e-mail: fbi@isomedia.com

September 11, 2012

Gerald Thompson, Project Manager
Alaskan Copper Works
628 South Hanford
Seattle, WA 98134

Dear Mr. Thompson:

Included are the results from the testing of material submitted on August 30, 2012 from the % of Acid M09434, F&BI 208448 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
ACU0911R.DOC